WHAT IS CLAIMED IS:

1. A method for preparing an optical fiber for use as a transducer in a moisture sensor, comprising the steps of:

(a) polishing the two ends of an optical fiber;

(b) applying a heat source to a portion of said optical fiber in order to remove the cladding layer of said portion;

(c) soaking said portion of said optical fiber in a first solution in order to wash off any organic material possibly sticking on the surface of said portion of said optical fiber;

(d) soaking said portion of said optical fiber in a second solution until the surface hydroxyl groups of said portion are activated; and

(e) coating at least said portion of said optical fiber with a porous sol-gel silica solution.

2. The method of Claim 1, wherein said first solution is a $K_2Cr_2O_7/H_2SO_4$ solution.

3. The method of Claim 2, wherein said soaking step (c) is performed for at least 30 minutes.

4. The method of Claim 1, wherein said second solution is a NaOH solution.

5. The method of Claim 4, wherein said second solution is at least a 2 M NaOH solution.

6. The method of Claim 5, wherein said soaking step (d) is performed for at least 12 hours.

7. The method of Claim 1, further comprising the steps of:

cooling said optical fiber to room temperature prior to said soaking step (c); and

rinsing said portion of said optical fiber with de-ionized water both prior to and after said soaking step (d).

8. The method of Claim 1, further comprising the step of:

refrigerating said optical fiber coated with said sol-gel silica solution for at least 12 hours.

9. The method of Claim 1, further comprising the step of bending said portion of said optical fiber during said applying step (b).

10. The method of Claim 9, wherein said portion of said optical fiber is bent into a "U" shape.

11. The method of Claim 9, wherein said portion of said optical fiber is bent into an "S" shape.

12. The method of Claim 1, wherein said coating step (e) is accomplished by dipping said at least said portion of said optical fiber in said porous sol-gel silica solution.

13. The method of Claim 1, wherein said portion of said optical fiber is about 0.5 to 2 cm long.

14. The method of Claim 1, wherein said sol-gel silica solution is prepared by hydrolyzing a silicate ester with water using a catalyst.

15. The method of Claim 14, wherein said silicate ester is selected from the group consisting of tetramethyl orthosilicate and tetraethyl orthosilicate.

16. The method of Claim 14, wherein said catalyst is a mineral acid catalyst.

17. The method of Claim 1, further comprising the step of:

(f) coating said portion of said optical fiber with a thin layer of silicone rubber solution.

18. The method of Claim 17, wherein said coating step (f) comprises the steps of:

dipping said portion of said optical fiber in a silicone rubber coating solution; and

air drying said optical fiber for at least 24 hours.

19. The method of Claim 17, wherein said silicone rubber coating solution is prepared by the steps of:

preparing a mixture comprising a silicon elastomer and a curing agent; and

diluting said mixture with toluene.

20. The method of Claim 1, further comprising the step of:

applying a second coating to said portion of said optical fiber with a permeable protective coating, wherein said second coating is made from the group consisting of: permeable polymers, permeable plastics, permeable thermoplastics, permeable polyurethanes, and permeable gels.

21. A transducer for an optical fiber moisture sensor made by the process of Claim 1.

22. A method for making a porous sol-gel silica solution for coating an optical fiber moisture sensor transducer, consisting of the step of:

hydrolyzing a silicate ester with water using a catalyst; wherein said silicate ester is selected from the group consisting of tetramethyl orthosilicate and tetraethyl orthosilicate; and wherein said catalyst is a mineral acid catalyst.

23. An optical fiber moisture sensor, comprising:

a light source;

a photodetector; and

an optical fiber, situated between said light source and said photodetector, having a fiber core portion;

wherein said fiber core portion is coated with a porous sol gel silica layer.

24. The optical fiber moisture sensor of Claim 23, wherein said fiber core portion of said optical fiber is about 0.5 to 2 cm long.

25. The optical fiber moisture sensor of Claim 23, wherein said light source is a near infrared light emitting diode.

26. The optical fiber moisture sensor of Claim 23, wherein said photodetector is a photodiode detector.

27. The optical fiber moisture sensor of Claim 23, wherein said fiber core is straight.

28. The optical fiber moisture sensor of Claim 23, wherein said fiber core is bent.

29. The optical fiber moisture sensor of Claim 28, wherein said fiber core is bent in a "U" shape.

30. The optical fiber moisture sensor of Claim 28, wherein said fiber core is bent in an "S" shape.

31. The optical fiber moisture sensor of Claim 23, wherein said light source emits radiation having a wavelength longer than 400 nm.

32. The optical fiber moisture sensor of Claim 23, wherein said light source emits radiation having a wavelength in the range of 500 nm to 700 nm.

33. The optical fiber moisture sensor of Claim 23, wherein said photodetector converts a light intensity signal to an electric signal.

34. The optical fiber moisture sensor of Claim 23, wherein the optical fiber moisture sensor operates on an evanescent wave light scattering (EWLS) principle.

35. The optical fiber moisture sensor of Claim 34, wherein said EWLS principle is used to measure moisture content in a gas phase.

36. The optical fiber moisture sensor of Claim 34, wherein said EWLS principle is used to measure moisture level in a gas phase present in indoor air.

37. The optical fiber moisture sensor of Claim 34, wherein said EWLS principle is used to measure moisture level in a gas phase present in outdoor air.

38. The optical fiber moisture sensor of Claim 34, wherein said EWLS principle is used to measure moisture level in a gas phase present in soil.

39. The optical fiber moisture sensor of Claim 34, wherein said EWLS principle is used to measure moisture level in a gas phase present in concrete.

40. The optical fiber moisture sensor of Claim 34, wherein said EWLS principle is used to measure moisture level in a gas phase present in a gas stream.